

Program Name

COM Climate Observations and Monitoring

CPO Partner: Climate Variability and Predictability (CVP)

OAR Partner: Global Ocean Monitoring and Observation Program (GOMO)

Program Mission

CVP and COM programs sit within the Earth System Science and Modeling Division (ESSM) of the NOAA Office of Oceanic and Atmospheric Research (OAR) Climate Program Office (CPO). GOMO is a program office that also sits within OAR.

This multi-program solicitation leverages the strengths of the ESSM programs, increasing the use and value of observations, advancing our process-level understanding of climate variability and change, and enhancing NOAA's ability to model and predict the Earth System: COM, which aims to increase the use and value of NOAA observations, supports research that leverages existing observational assets to develop value-added datasets and products for broad community use; CVP, which aims to advance understanding of climate variability and change, supports research that advances process-level understanding of the climate system through observation, modeling, and analysis studies. To achieve their missions, these and other ESSM programs work collaboratively across CPO and with NOAA and other federal laboratories, Cooperative Institutes, and academic institutions, and interagency coordination bodies (e.g. USGCRP, CLIVAR).

The Global Ocean Monitoring and Observation Program (GOMO) is a contributing partner that provides long-term, high-quality, in situ global ocean observations and products critical for informing and enhancing predictive models and forecasts on daily to decadal timescales. These observations are vital for characterizing changes of the global ocean environment and enabling advances in knowledge to better characterize the ocean's role in the earth system. GOMO's mission traditionally focused on the role of the oceans on climate and observations focused on ocean transport and the distribution of heat and salinity. GOMO has diversified its observation suite to meet new observing needs, taking advantage of advances in technology to include ocean biogeochemistry, sea ice, and sea surface height. The last 15 years have seen remarkable advances in measurement platform technologies, including profiling floats (some capable of diving to 6000m), gliders, and self-propelled surface observing systems. Further enhancements of platform measurement suites include observations of sea surface fluxes and atmospheric variables as well as biogeochemical variables in the ocean interior.

Focus for FY21

Title: Innovative Ocean Dataset/Product Analysis and Development for support of the NOAA Observing and Climate Modeling Communities

Funding for FY21

Pending the availability of funds in FY21, it is anticipated that \$1.2M will be available per year over three years. Proposals should target a level of funding of up to \$150K per year, for up to three years (Total project costs should not to exceed \$450K).

Competition Information

Observations are a foundational element of the climate research and services enterprise. NOAA OAR laboratories and programs, and its national and international partners, invest significantly in developing and sustaining the global climate observing system and have made decades of investments in climate process-based field campaigns¹. While observing systems and field campaigns provide data and related metadata, raw data alone are often insufficient to realize the full value of these observations due to inherent variability, measurement uncertainty, or coverage gaps^{2,3} as well as the suboptimal integration of the observational and modeling communities. Observational investments are valuable resources for model evaluation, model improvement, calibration and validation of satellite products; however, intermediate steps are required, such as dataset development through integration across instruments and platforms (e.g. Argo, buoy, etc.) to make these data useful to the modeling and satellite communities. Bringing observations to the modeling and satellite communities also provides a measure of the impact of observing systems, and enables improvements for future field campaigns and sustained observation efforts.

In the last few years, reports by the National Academies of Science,⁴ the ocean observing community⁵ and CPO's Earth System Science and Modeling Division's community⁶ have called on observationalists, modelers, and data assimilation practitioners to improve the use of existing observations, and to jointly consider physical, chemical, and biological processes operating at different scales. Reports also highlighted many autonomous and emerging ocean observations are underutilized, including potential future biogeochemical ocean observations prioritized in

¹ Field campaigns: DYNAMO ([information](#)), Year of the Maritime Continent ([information](#)), ATOMIC ([information](#))

² National Research Council 2012. *A National Strategy for Advancing Climate Modeling*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/13430>.

³ Weatherhead et al. 2018. Designing the Climate Observing System of the Future. *Earth's Future*, 6(1): 80-102. <https://doi.org/10.1002/2017EF000627>.

⁴ NAS Next Generation Earth System Prediction: Strategies for Subseasonal to Seasonal

⁵ [OceanObs'19 White Paper Synthesis](#) (e.g. Penny et al. 2019, Fox-Kemper et al. 2019)

⁶ [Annual ESSM Community Workshop 2018](#)

NOAA's [Science Advisory Board's Subseasonal to Seasonal to Decadal report](#)⁷, and others⁸.

With the advent of new methods, approaches, and technologies, coupled with the unprecedented rate of global change, the Climate Program Office has the opportunity to support research and facilitate partnerships across the external and NOAA communities that will increase the use of observations, including but not limited to those supported by NOAA, in advancing detection of changes in the atmosphere and ocean, and understanding of the earth system⁹, ultimately furthering monitoring, detection, and prediction of the earth system for societal applications central to NOAA's mission.

In FY21, this multi-program competition is soliciting proposals that will increase the usefulness of NOAA observations to the NOAA observing, modeling and/or satellite communities, and/or the broader scientific community by one of the following:

1. Developing new observation-based (in situ, satellite) ocean synthesis datasets or products (physical and/or biogeochemical) for climate monitoring or modeling applications through applying existing methods or developing new, state-of-art, innovative methods and approaches (e.g. ocean state estimation, data assimilation, and quantification of observational uncertainty).

Applicants must describe the utility of these products to advance all of the following:

- Increases the use of NOAA's historical field campaign data and/or emerging observations from sustained observing networks and systems (e.g., those for air-sea fluxes, and biogeochemical processes). The combined use of NOAA and non-NOAA observations is permitted.
- Enables improved climate modeling or monitoring (e.g., enables future climate model evaluation, validation, process-oriented diagnostics, and/or satellite calibration and validation).

Improvements to existing observation-based datasets or products will be considered, but proposals focused on improvements, in addition to the above bullets must: a) rapidly accelerate the use of observations, b) demonstrate an example of the potential for high impact for advancing climate understanding/applications, and c) include a plan to engage (or a collaboration with) the recipient community or user.

2. Evaluating current methods and approaches for ocean observing and modeling, and the ability of observed and modeled data/products to reproduce physical or biogeochemical processes, climate phenomena, or interactions between Earth System components on different timescales. Proposals should examine bias(es) in observed and modeled

⁷ NOAA Science Advisory Board [Subseasonal to Seasonal to Decadal Report](#)

⁸ [NOAA Draft OAR Ocean Acidification Science Plan 2020 - 2029](#)

⁹ [OAR Strategy 2020 - 2026](#): Goal 2: Objective 2.2; Objective 2.3; Goal 3: Objective 2.1

data/products and advance understanding of the cause(s) for large differences between observed and modeled ocean data/products. Collaborations between the ocean observing and climate modeling community are strongly encouraged for Type 2 proposals.

Proposal submissions to (1) or (2) with a global or regional focus are invited. Regional-focused proposals are encouraged to include one or more of the following areas: Indian Ocean (DYNAMO field area), Maritime Continent (Years of Maritime Continent field area), Tropical Pacific (TPOS/SPURS-2/related NOAA observations) or Northwest Tropical Atlantic (ATOMIC field area).

Proposals must utilize NOAA observations and can use other observations where appropriate. Observations can span multiple platforms (e.g. in situ, satellite) and be sustained or of limited duration (e.g. field campaigns). Applicants are strongly encouraged to collaborate with members of the targeted user community (e.g. modeling, satellite, or other), and should articulate how datasets, products, and/or approaches will be accessible, have demonstrable value, and therefore be readily taken up by the user communities.

Datasets or products that are intended to be sustained, beyond static archival, by NOAA after the duration of the award must include a plan for future maintenance and letters of support from the corresponding program, lab, or office in the supplemental materials.

Collaboration/engagement with NOAA line offices, NOAA OAR laboratories, and NOAA Cooperative Institutes is encouraged, but not required.

Projects will start either in FY21 or FY22, depending on the needs of the project and the availability of funding.

Data Archiving

Proposals must include a Data Management Plan of up to two pages aligned with the following Data Management Guidance.

Applicants are strongly encouraged to follow FAIR principles¹⁰ in data management.

Responsible NOAA Official: For questions regarding this guidance and for verifying accessibility of data produced by funding recipients: Virginia Selz (virginia.selz@noaa.gov, 301-734-1265)

Data Accessibility: Programs require that public access to grant/contract-produced data be enabled in one of the following ways:

¹⁰ [Wilkinson 2016. FAIR Guiding Principles for Scientific Data Management and Stewardship. *Scientific Data*, 3: 160018.](#)

- Funding recipients may submit data to NOAA National Centers for Environmental Information (NCEI), which will provide public access and permanent archiving¹¹. Proposers seeking to utilize this option should contact NCEI in advance of submission (ncei.archive@noaa.gov).
- Data can be submitted to a public data repository appropriate to this scientific domain (describe in proposal).
- Funding recipients can establish their own data hosting capability (describe in proposal).

Technical recommendations: The Programs are not offering specific technical guidance. Proposals are to describe their proposed approach. Use of open-standard formats and methods is encouraged.

Resources: Proposals are permitted to include the costs of data sharing or archiving in their budgets.

Points of Contact

General Guidelines for FY2021 Multi-program competition proposal submission: Principal Investigators submitting a proposal in response to this announcement are required to follow the Letters of Intent and Proposal preparation and submission guidelines described in the Climate Program Office FY2021 Federal Funding Opportunity announcement. Investigators are strongly encouraged to submit a Letter of Intent prior to developing and submitting a full proposal. Letters of Intent should be sent via email directly to the Competition Manager, Virginia Selz.

Administrative questions regarding the Federal Funding Opportunity (e. g. proposal formatting or submission guidelines) should be directed to Diane Brown (diane.brown@noaa.gov) Questions regarding details of the solicitation should be directed to Virginia Selz (virginia.selz@noaa.gov).

Competition POC (send all inquiries and LOIs)

COM Program Manager

Virginia Selz

virginia.selz@noaa.gov

CVP Program Manager

Sandy Lucas

sandy.lucas@noaa.gov

GOMO Program Manager

Kathy Tedesco

kathy.tedesco@noaa.gov

¹¹ NCEI supports the creation of adequate metadata and data transfer into long term repository holdings using tools such as Send2NCEI (www.nodc.noaa.gov/s2n, for small volume, one-time only data collections) and Advanced Tracking and Resource tool for Archive Collections or ATRAC (www.ncdc.noaa.gov/atrac, for recurring and/or large volume data collections).